CLAIMS

1. A method of managing a data buffer (120) comprising a queue of consecutive segments of data packets in a base station system (100) of a mobile communications system (1), comprising the steps of:

- said base station system (100) analyzing information associated with data packet segments in said buffer (120) for identifying a complete data packet in said buffer (120) based on said analyzed information; and
- said base station system (100) discarding said identified complete data packet from said buffer (120).

2. The method according to claim 1, wherein said analyzing step comprises the steps of:

- said base station system (100) receiving said information from a network node (200) segmenting complete data packets into data packet segments in said communications system (1); and
- said base station system (100) comparing said information with a data packet identifier.

3. The method according to claim 2, further comprising the step of said data packet segmenting network node (200) transmitting a data packet unit to said base station system (100), said data packet unit comprises said information and said associated data packet segment.

4. The method according to claim 3, wherein said information comprises at least one of:

- a notification whether said associated data packet segment is a last data packet segment of said complete data packet, whereby said data packet identifier comprises a copy of said notification;
- a notification whether said associated data packet segment is a first data packet segment of said complete data packet, whereby said data packet identifier comprises a copy of said notification; and

- a notification whether said associated data packet segment is an intermediate data packet segment of said complete data packet, whereby said data packet identifier comprises a copy of said notification.

5. The method according to claim 3, wherein said data packet unit is a Base Station System GPRS Protocol (BSSGP) Packet Data Unit (PDU) and said information is included in an information field of said BSSGP PDU.

6. The method according to claim 3, wherein said data packet unit further comprises data packet format information, wherein said format information enables said base station system (100) to identify the data packet format of said associated data packet segment.

7. The method according to claim 1, wherein said analyzing step comprises the steps of:

- comparing a size (S(k)) of a data packet segment (P(k)) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120); and
- identifying said complete data packet based on said comparison.

8. The method according to claim 7, wherein said identifying step comprises the steps of:

- identifying said next data packet segment (P(k+1)) as a first data packet segment (P(FIRST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) is smaller than said size (S(k+1)) of said next data packet segment (S(k+1)); and
- associating said identified first data packet segment (P(FIRST)) with a first segment identifier (FIRST), wherein said information comprises said first segment identifier (FIRST).

9. The method according to claim 7, wherein said identifying step comprises the steps of:

- identifying said next data packet segment (P(k+1)) as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) differs from said size (S(k+1)) of said next data packet segment (P(k+1)); and
- associating said identified last data packet segment (P(LAST)) with a last segment identifier (LAST), wherein said information comprises said last segment identifier (LAST).

10. The method according to claim 8 and 9, wherein said discarding step comprises the step of discarding said data packet segment (P(FIRST)) associated with said first segment identifier (FIRST), said data packet segment (P(LAST)) associated with said last segment identifier (LAST) and any intermediate data packet segments between said data packet segment (P(FIRST)) associated with said first segment identifier (FIRST) and said data packet segment (P(LAST)) associated with said last segment identifier (LAST) in said buffer (120) as determined based on said information.

11. The method according to claim 1, wherein said complete data packet is an Internet Protocol (IP) data packet and said data packet segment is a Logical Link Control (LLC) Packet Data Unit (PDU).

12. The method according to claim 1, wherein said communications system (1) is selected from at least one of:

- a General Packet Radio Service (GPRS) communications system;
- an Enhanced GPRS (EGPRS) communications system; and
- an Enhanced Data rates for Global Evolution (EDGE)/GPRS communications system.

13. A system (130) for managing a data buffer (120) comprising a queue of consecutive segments of data packets in a base station system (100) of a mobile communications system (1), comprising:

- means (132) for analyzing information associated with data packet segments in said buffer (120) for identifying a complete data packet in said buffer (120) based on said analyzed information; and
- means (136) for discarding said identified complete data packet from said buffer (120).

14. A base station system (100) of a mobile communications system (1) comprising:

- a data buffer (120) comprising a queue of consecutive segments of data packets;
- means (132) for analyzing information associated with data packet segments in said buffer (120) for identifying a complete data packet in said buffer (120) based on said analyzed information; and
- means (136) for discarding said identified complete data packet from said buffer (120).

15. The system according to claim 13 or 14, wherein said analyzing means (132) is connected to means (110) for receiving said information from a network node (200) segmenting complete data packets into data packet segments in said communications system (1), whereby said analyzing means (132) is adapted for comparing said information with a data packet identifier.

16. The system according to claim 15, wherein said data packet segmenting network node (200) comprises means (210) for transmitting a data packet unit to said base station system (100), said data packet unit comprises said information and said associated data packet segment.

17. The system according to claim 16, wherein said information comprises at least one of:

- a notification whether said associated data packet segment is a last data packet segment of said complete data packet, whereby said data packet identifier comprises a copy of said notification;

- a notification whether said associated data packet segment is a first data packet segment of said complete data packet, whereby said data packet identifier comprises a copy of said notification; and
- a notification whether said associated data packet segment is an intermediate data packet segment of said complete data packet, whereby said data packet identifier comprises a copy of said notification.

18. The system according to claim 16, wherein said data packet unit is a Base Station System GPRS Protocol (BSSGP) Packet Data Unit (PDU) and said information is included in an information field of said BSSGP PDU.

19. The system according to claim 16, wherein said data packet unit further comprises data packet format information, wherein said system (100; 130) comprises means (148) for identifying the data packet format of said associated data packet segment based on said format information.

20. The system according to claim 13 or 14, wherein said analyzing means (132) comprises:

- means (146) for comparing a size (S(k)) of a data packet segment (P(k)) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120); and
- means (140) for identifying said complete data packet based on said comparison.

21. The system according to claim 20, wherein said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a first data packet (P(FIRST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) is smaller than said size (S(k+1)) of said next data packet segment (P(k+1)), said analyzing means (140) further comprises means (142) for associating said identified first data packet segment (P(FIRST)) with a first segment identifier (FIRST), wherein said information comprises said first segment identifier (FIRST).

22. The system according to claim 20, wherein said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) differs from said size (S(k+1)) of said next data packet segment (P(k+1)), said analyzing means (140) further comprises means (142) for associating said identified last data packet segment (P(LAST)) with a last segment identifier (LAST), wherein said information comprises said last segment identifier (LAST).

23. The system according to claim 21 and 22, wherein said discarding means (136) is adapted for discarding said data packet segment (P(FIRST)) associated with said first segment identifier (FIRST), said data packet segment (P(LAST)) associated with said last segment identifier (LAST) and any intermediate data packet segments between said data packet segment (P(FIRST)) associated with said first segment identifier (FIRST) and said data packet segment (P(LAST)) associated with said last segment identifier (LAST) in said buffer (120) as determined based on said information.

24. The system according to claim 13 or 14, wherein said complete data packet is an Internet Protocol (IP) data packet and said data packet segment is a Logical Link Control (LLC) Packet Data Unit (PDU).

25. The system according to claim 13 or 14, wherein said communications system (1) is selected from at least one of:

- a General Packet Radio Service (GPRS) communications system;
- an Enhanced GPRS (EGPRS) communications system; and
- an Enhanced Data rates for Global Evolution (EDGE)/GPRS communications system.

26. A base station network node of a base station system (100) in a mobile communications system (1) comprising:

- a data buffer (120) comprising a queue of consecutive segments of data packets;

- means (132) for analyzing information associated with data packet segments in said buffer (120) for identifying a complete data packet in said buffer (120) based on said analyzed information; and
- means (136) for discarding said identified complete data packet from said buffer (120).

27. The network node according to claim 26, wherein said analyzing means (132) is connected to means (110) for receiving said information from a network node (200) segmenting complete data packets into data packet segments in said communications system (1), whereby said analyzing means (132) is adapted for comparing said information with a data packet identifier.

28. The network node according to claim 26, wherein said analyzing means (132) comprises:
- means (146) for comparing a size (S(k)) of a data packet segment (P(k)) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120); and
- means (140) for identifying said complete data packet based on said comparison.

29. The network node according to claim 28, wherein said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a first data packet (P(FIRST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) is smaller than said size (S(k+1)) of said next data packet segment (P(k+1)), said analyzing means (140) further comprises means (142) for associating said identified first data packet segment (P(FIRST)) with a first segment identifier (FIRST), wherein said information comprises said first segment identifier (FIRST).

30. The network node according to claim 28, wherein said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) differs from said size

(S(k+1)) of said next data packet segment (P(k+1)), said analyzing means (140) further comprises means (142) for associating said identified last data packet segment (P(LAST)) with a last segment identifier (LAST), wherein said information comprises said last segment identifier (LAST).

31. The network node according to claim 29 and 30, wherein said discarding means (136) is adapted for discarding said data packet segment (P(FIRST)) associated with said first segment identifier (FIRST), said data packet segment (P(LAST)) associated with said last segment identifier (LAST) and any intermediate data packet segments between said data packet segment (P(FIRST)) associated with said first segment identifier (FIRST) and said data packet segment (P(LAST)) associated with said last segment identifier (LAST) in said buffer (120) as determined based on said information.

32. A support network node (200) in a mobile communications system (1) comprising:

- means (220) for segmenting a complete data packet into a number of data packet segments;
- means (230) for associating data packet information to data packet segments; and
- means (210) for transmitting said data packet segments to a data buffer (120) in an associated base station system (100), said information enabling said base station system (100) to identify said complete data packet.

33. The support node according to claim 32, wherein said support node (200) is a Serving General Packet Radio Service (GPRS) Support Node (SGSN).

34. The support node according to claim 32, wherein said information comprises at least one of:

- a notification whether an associated data packet segment is a last data packet segment of said complete data packet;
- a notification whether an associated data packet segment is a first data packet segment of said complete data packet; and

- a notification whether an associated data packet segment is an intermediate data packet segment of said complete data packet.

35. The support node according to claim 32, wherein said transmitting means (210) is adapted for transmitting said data packet segments as Base Station System GPRS Protocol (BSSGP) Packet Data Units (PDUs) and said information is included in an information field of said BSSGP PDUs.

36. The support node according to claim 32, wherein said associating means (230) is adapted for associating data packet format information to said data packet segments, said data packet format information enables said base station system (100) to identify the data packet format of said associated data packet segments.

37. A method of enabling identification of a complete data packet in a data buffer (120) comprising a queue of consecutive data packet segments, comprising the steps of:

- comparing a size (S(k)) of a data packet segment (P(k)) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120); and
- identifying said complete data packet based on said comparison.

38. The method according to claim 37, further comprising the step of providing a segment counter (k) associated with a data packet segment (P(k)) in said buffer (120).

39. The method according to claim 38, further comprising the steps of:

- comparing a size (S(k)) of said data packet segment (P(k)) associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120);
- identifying said next data packet segment (P(k+1)) as a first data packet segment (P(FIRST)) of said complete data packet in said buffer (120) if

said size (S(k)) of said data packet segment (P(k)) associated with said counter (k) is smaller than said size (S(k+1)) of said next data packet segment (P(k+1)).

40. The method according to claim 38, further comprising the steps of:

(a) comparing a size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120); and

(b) associating said counter (k) with said next data packet segment (P(k+1)) if said size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) is equal to or larger than said size (S(k+1)) of said next data packet segment (P(k+1)); and

- repeating both said comparison step (a) and said associating step (b) until said size (S(k)) of the data packet (P(k)) currently associated with said counter (k) is smaller than said size (S(k+1)) of said next data packet segment (P(k+1)), whereby said next data packet segment (P(k+1)) is identified as a first data packet segment (P(FIRST)) of said complete data packet in said buffer (120).

41. The method according to claim 38, further comprising the steps of:

- comparing a size (S(k)) of said data packet segment (P(k)) associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120); and

- identifying said next data packet segment (P(k+1)) as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) associated with said counter (k) differs from said size (S(k+1)) of said next data packet segment (P(k+1)).

42. The method according to claim 38, further comprising the steps of:

(c) comparing a size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120);

(d) associating said counter (k) with said next data packet segment (P(k+1)) if said size (S(k)) of the data packet segment (P(k)) currently associated

with said counter (k) is equal to said size (S(k)) of said next data packet segment (P(k+1)); and

- repeating both said comparison step (c) and said associating step (d) until said size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) differs from said size (S(k+1)) of said next data packet segment (P(k+1)), whereby said next data packet segment (P(k+1)) is identified as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120).

43. The method according to claim 39 or 40, further comprising the step of associating said segment counter (k) with said first data packet segment (P(FIRST)) of said complete data packet.

44. The method according to claim 43, further comprising the steps of:

- comparing a size (S(k)) of said data packet segment (P(k)) associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120); and

- identifying said next data packet segment (P(k+1)) as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) associated with said counter (k) differs from said size (S(k+1)) of said next data packet segment (P(k+1)).

45. The method according to claim 44, wherein said complete data packet is identified as comprising said first data packet segment (P(FIRST)) of said complete data packet, said last data packet segment (P(LAST)) of said complete data packet and any intermediate data packet segments between said first (P(FIRST)) and last (P(LAST)) data packet segment of said complete data packet in said buffer (120).

46. The method according to claim 44, further comprising the steps of:

- determining a total size of said first data packet segment (P(FIRST)) of said complete data packet, said last data packet segment (P(LAST)) of said complete data packet and any intermediate data packet segments between

said first (P(FIRST)) and last (P(LAST)) data packet segment of said complete data packet in said buffer (120);

- comparing said total size with a minimum size threshold; and
- identifying said complete data packet as comprising said first data packet segment (P(FIRST)) of said complete data packet, said last data packet segment (P(LAST)) of said complete data packet and any intermediate data packet segments between said first (P(FIRST)) and last (P(LAST)) data packet segment of said complete data packet in said buffer (120) if said total size is larger than said minimum size threshold.

47. A system (140) for enabling identification of a complete data packet in a data buffer (120) comprising a queue of consecutive data packet segments, comprising:

- means (146) for comparing a size (S(k)) of a data packet segment (P(k)) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120); and
- means (140) for identifying said complete data packet based on said comparison.

48. The system according to claim 47, comprising means (142) for associating a segment counter (k) with a data packet segment (P(k)) in said buffer (120).

49. The system according to claim 48, wherein said comparison means (146) is adapted for comparing a size (S(k)) of said data packet segment (P(k)) associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120), wherein said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a first data packet segment (P(FIRST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) associated with said counter (k) is smaller than said size (S(k+1)) of said next data packet segment (P(k+1)).

50. The system according to claim 48, wherein said comparison means (146) is adapted for comparing a size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120), wherein said associating means (142) is adapted for associating said counter (k) with said next data packet segment (P(k+1)) if said size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) is equal to or larger than said size (S(k+1)) of said next data packet segment (P(k+1)), said comparison means (146) is adapted for repeating said size comparison and said associating means (142) is adapted for repeating said counter association until said size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) is smaller than said size (S(k+1)) of said next data packet segment (P(k+1)), whereby said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a first data packet segment (P(FIRST)) of said complete data packet in said buffer (120).

51. The system according to claim 48, wherein said comparison means (146) is adapted for comparing a size (S(k)) of said data packet segment (P(k)) associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120), wherein said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) associated with said counter (k) differs from said size (S(k+1)) of said next data packet segment (P(k+1)).

52. The system according to claim 48, wherein said comparison means (146) is adapted for comparing a size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120), wherein said associating means (142) is adapted for associating said counter (k) with said next data packet segment (P(k+1)) if said size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) is equal to said size (S(k+1)) of

said next data packet segment (P(k+1)), said comparison means (146) is adapted for repeating said size comparison and said associating means (142) is adapted for repeating said counter associating until said size (S(k)) of the data packet segment (P(k)) currently associated with said counter (k) differs from said size (S(k+1)) of said next data packet segment (P(k+1)), whereby said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120).

53. The system according to claim 49 or 50, wherein said associating means (142) is adapted for associating said segment counter (k) with said first data packet segment (P(FIRST)) of said complete data packet.

54. The method according to claim 53, wherein said comparison means (146) is adapted for comparing a size (S(k)) of said data packet segment (P(k)) associated with said counter (k) with a size (S(k+1)) of a next consecutive data packet segment (P(k+1)) in said buffer (120), wherein said identifying means (140) is adapted for identifying said next data packet segment (P(k+1)) as a last data packet segment (P(LAST)) of said complete data packet in said buffer (120) if said size (S(k)) of said data packet segment (P(k)) associated with said counter (k) differs from said size (S(k+1)) of said next data packet segment (P(k+1)).

55. The system according to claim 54, wherein said identifying means (140) is adapted for identifying said complete data packet as comprising said first data packet segment (P(FIRST)) of said complete data packet, said last data packet segment (P(LAST)) of said complete data packet and any intermediate data packet segments between said first (P(FIRST)) and last (P(LAST)) data packet segment of said complete data packet in said buffer (120).

56. The system according to claim 54, further comprising means (142) for determining a total size of said first data packet segment (P(FIRST)) of said complete data packet, said last data packet segment (P(LAST)) of said complete

data packet and any intermediate data packet segments between said first (P(FIRST)) and last (P(LAST)) data packet segment of said complete data packet in said buffer (120), said comparison means (146) is adapted for comparing said total size with a minimum size threshold, and said identifying means (140) is adapted for identifying said complete data packet as comprising said first data packet segment (P(FIRST)) of said complete data packet, said last data packet segment (P(LAST)) of said complete data packet and any intermediate data packet segments between said first (P(FIRST)) and last (P(LAST)) data packet segment of said complete data packet in said buffer (120) if said total size is larger than said minimum size threshold.
